



National Fire Danger Rating System Operating Plan



US Forest Service, Prescott National Forest

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I. INTRODUCTION

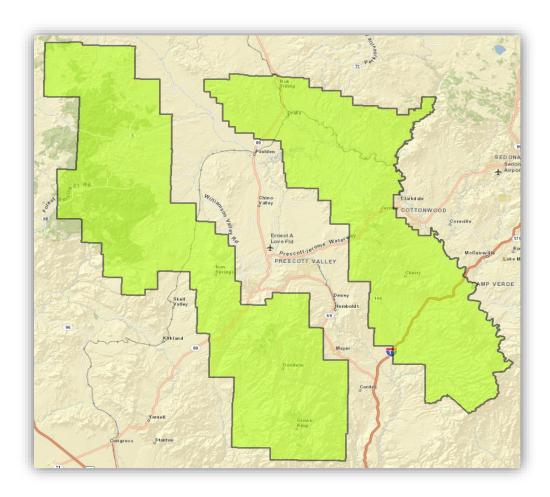
A. Purpose

The purpose of this operating plan is to define roles, responsibilities and operational procedures for the National Fire Danger Rating System as it applies to Unit preparedness. This plan complies with direction outlined in the Forest Service Manual¹ and the Interagency Standards for Fire and Fire Aviation Operations².

The NFDRS Operating Plan is a stand-alone document and is an appendix to the Prescott National Forest Fire Management Plan and the Prescott Dispatch Center Annual Operating Plan.

B. Area of Influence

The area of influence is the land administered by the <u>Prescott National Forest</u>.



¹ Forest Service Manual 5124 - Fire Danger Rating

² Interagency Standards for Fire and Fire Aviation Operations, Chapter 10 - Preparedness

C. Objectives

- Document the establishment and management of the weather station network.
- Describe how fire danger ratings are applied to management decisions.
- Define the roles and responsibilities for implementation and management of the plan, including associated training.
- Identify management decisions related to fire danger rating and define how NFDRS contributes to different decision types.
- Document the periodic management that is required to produce accurate outputs from the rating system.
- Define the area of responsibility to include the identification of fire danger rating areas.
- Determine climatic breakpoints and fire business thresholds and apply to the decision process.

II. ROLES AND RESPONSIBILITIES

A. Forest Supervisor

The Forest Supervisor is responsible for planning and implementing a preparedness program that is documented in the Fire Management Plan. Also, the Forest Supervisor will ensure that the NFDRS Operating Plan is developed and maintained.

B. Prescott Dispatch Center (PDC)

The PDC is responsible for the implementation of the plan. This includes maintenance of the weather station network, management of the Weather Information Management System and dissemination of the NFDRS outputs. The PDC will activate the PNF Preplanned Response and update the PNF Preparedness Level daily during fire season. The role of the PNF RAWS Coordinator will be filled by an individual from the PDC. The PDC will also produce and distribute the PNF Fire Danger Pocket Cards according to established standards.

C. Fire Staff Officer

It is the responsibility of the Fire Staff Officer to ensure this plan is utilized, maintained and communicated. This position maintains oversight of the plan and monitors the plan to ensure the results are aligned with the direction of the fire program. Also, the Fire Staff Officer shall confirm NFDRS training is accomplished at the appropriate levels.

D. Zone Duty Officer

The role of the Zone Duty Officer, as it relates to this plan, is to monitor the outputs from the NFDRS and coordinate with the Prescott Dispatch Center on a daily basis. It is the responsibility of the duty officer to ensure that the appropriate state of preparedness exists within their zone. The Zone Duty Officer maintains the authority to modify the preplanned response and adjust staffing based on the current situation.

E. National Weather Service

Daily fire weather forecasts will be developed and distributed by the National Weather Service Forecast Office in Flagstaff. This responsibility includes the production of the Fire Weather Planning Forecast twice daily (morning and afternoon) and posting to the internet. Another responsibility of the NWS is to respond to on-demand requests for Spot Weather forecasts and to post this product on their website. The NWS will also generate forecasted NFDRS indices for the following day, which can be accessed through WIMS.

F. Southwest Area Predictive Services Unit

The Southwest Area Predictive Services Unit develops numerous products related to the NFDRS. These products are developed for the entire Geographic Area and they assist with fire danger rating decisions at the local level. This group disseminates their information through the <u>Southwest Coordination Center website</u>. Some products available through the Southwest Area Predictive Services Unit include NFDRS charts, fuel moisture data, fire potential outlooks and forecasted NFDRS indices. Also, regional and national pocket cards are available to download from the SWCC website.

III. OPERATIONAL PROCEDURES

A. Weather Station Network

The Prescott National Forest Weather Station Network consists of four Remote Automated Weather Stations including Cherry, Crown King, Iron Springs and Verde (Figure 1).

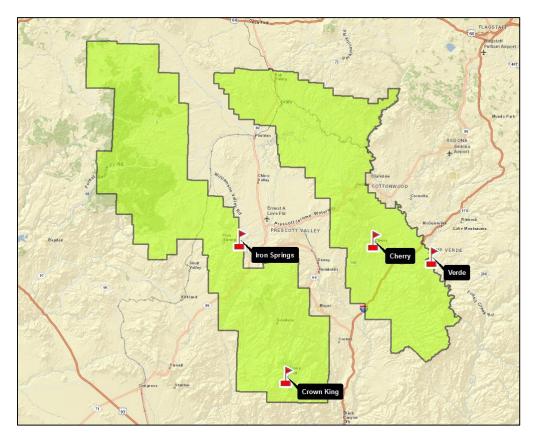


Figure 1 - Prescott NF Remote Automated Weather Stations

1. Cherry

The Cherry weather station is located northwest of the community of Cherry, AZ. This station was manufactured by Vaisala but received an FTS upgrade in July, 2013 with new sensors, transmitter and datalogger installed. The station is on a Bureau of Land Management (BLM) Depot Maintenance Agreement contract. The cost of this contract is \$900 per year which is normally covered by the US Forest Service Southwest Regional Office. Annual maintenance and emergency repair is accomplished by the PNF RAWS Coordinator in accordance with NWCG standards.

2. Crown King

The Crown King weather station is located near the community of Crown King, AZ. This station was manufactured by Vaisala but received an FTS upgrade in May 2012 with new sensors, transmitter and datalogger installed. The station is on a BLM Depot Maintenance Agreement contract. The cost of this contract is \$900 per year which is normally covered by the USFS Southwest Regional Office. Annual maintenance and emergency repair is accomplished by the PNF RAWS Coordinator in accordance with NWCG standards.

3. Iron Springs

The Iron Springs weather station is located near the city of Prescott, AZ. This station was manufactured by Forest Technology Systems (FTS) and is on an Annual On-Site (AOM) contract. The cost of this contract is \$2,400 which is normally covered by the USFS Southwest Regional Office. Annual maintenance and emergency repair is accomplished by FTS, in accordance with NWCG standards. The PNF RAWS Coordinator assists with both annual maintenance and emergency repair.

4. Verde

The Verde weather station is located east of the Verde River, at the Verde Ranger District Office. This station was manufactured by Vaisala but received an FTS upgrade in July 2013 with new sensors, transmitter and datalogger installed. The station is on a BLM Depot Maintenance Agreement contract. The cost of this contract is \$900 per year which is normally covered by the USFS Southwest Regional Office. Annual maintenance and emergency repair is accomplished by the PNF RAWS Coordinator in accordance with NWCG standards.

B. Weather Station Maintenance Schedule

The Prescott National Forest weather station network will be maintained annually to meet NWCG standards.

• Refer to Appendix A: PNF RAWS Maintenance Schedule

C. Management Decisions

1. Fire Preparedness

The <u>Energy Release Component</u> is the primary NFDRS output that drives decision making on the Prescott NF. It is the main input in decision tools such as the Preparedness Level, the Response Level and the Restrictions/Closure Decision Matrix. The scale for ERC is determined using historic weather data from 1995 to the present and the established fire season of April through September.

a. Prescott NF Preparedness Level

The PNF Preparedness Level is a tool that provides fire management with decision considerations based on the level of preparedness. This product is long range in scope and assists with overall unit preparedness. There are five elements or criteria that combine to determine the preparedness level. These criteria include <u>Staffing Level</u>, PNF resource commitment, PNF fire activity, the <u>Southwest Area Preparedness Level</u>, and the <u>7-Day Outlook</u>.

• Refer to Appendix B: PNF Preparedness Level

b. Prescott NF Preplanned Response

The preplanned response is determined by the PNF Response Level. This product is short term in scope and provides staffing decision considerations on a day-to-day basis. The Response Level is calculated for the PNF Mountains & PNF Valleys/Basins and includes five levels; Low, Moderate, High, Very High and Extreme. The primary PNF Duty Officers have determined the appropriate resources to dispatch based on the Response Level.

The criteria for determining the PNF Response Level includes the Staffing Level, the PNF Preparedness Level, <u>Red Flag Warning</u>, <u>Haines Index</u>, the 7-Day Outlook and the <u>Lightning Activity Level</u>.

Refer to Appendix C: PNF Response Level

2. Public Restrictions and Closures

Public Restriction and Closures on the Prescott National Forest involve stages of restrictions based on the Southwest Fire Restrictions & Closure Operating Plan.

The PNF Restriction/Closure Matrix takes into account several quantifiable and subjective criteria. The quantifiable criteria include the PNF Preparedness Level, the Southwest Area Preparedness Level, proximity to historic onset of monsoon and the NOAA Monthly Outlook. Subjective factors in the decision include the current level of recreation use, coordination with neighboring units, and local impacts.

• Refer to Appendix D: PNF Restriction/Closure Decision Matrix

3. Industrial Restrictions and Closures

Restrictions and limitations will be placed on contractors operating on the Prescott National Forest. These restrictions will be based directly on the stages of Public Restrictions and Closures. Each stage of public restriction correlates to a defined level of restrictions for industrial use.

• Refer to Appendix E: PNF Industrial Fire Precautions Plan

D. Periodic Management

1. Weather Information Management System (WIMS)

Management of WIMS involves both daily and seasonal oversight and administration. On a daily basis, raw weather data must be validated and state of the weather edited for the 1300 hour. This initiates the production of both observed and forecasted NFDRS indices. Also, this process ensures accurate weather data is being recorded for each of the RAWS and initiates timely troubleshooting in the event of a station malfunction.

Equally important, seasonal management must occur within WIMS. For each RAWS, modification needs to be made to reflect current conditions. In January, each station will be in a Frozen state. As spring approaches, the change will be made to Pre-Green, then Green-up. The weather station will then automatically go into a state of Transition and finally to Cured. Locally, it is not uncommon for the area to experience two periods of green-up annually (spring and monsoon), so this process usually needs to be done in WIMS twice per year.

2. National Interagency Fire Management Integrated Database (NIFMID)

NIFMID is a storage database for weather observations from WIMS. WIMS does not retain historical weather data so this database ensures that data is stored and available to retrieve for use in other applications. The daily processes in WIMS are critical to ensure the data is archived in NIFMID.

3. Fire Family Plus

Fire Family Plus is an application used to evaluate weather data and process NFDRS indices and display both in graphical form. Periodic management is required in order to produce useful and accurate information. This includes importing data into the system such as weather station catalogs, fire history and weather data from Remote Automated Weather Stations. Frequent validation of the data being imported is necessary as corrupt or missing data will influence the outputs of the system.

E. Fire Danger Pocket Card

The Fire Danger Pocket Card is a method of communicating information on local fire danger. The objective is to promote situational awareness regarding fire danger. The pocket card provides a description of seasonal changes in fire danger associated with the local unit. It also describes local thresholds based on historic weather data.

The Prescott National Forest Pocket Cards are created using the Fire Family Plus software and meet NWCG standards for content, currency and implementation.³ The

³ Link to NWCG Standards for Fire Danger Pocket Cards

data set used for the cards will be April to September, from 1995 to present. Direction regarding regional certification, distribution and internet posting of the cards is found in the Forest Service Manual.⁴

• Refer to Appendix F: PNF Pocket Cards

IV. FIRE DANGER RATING INVENTORY

A. Administrative Unit

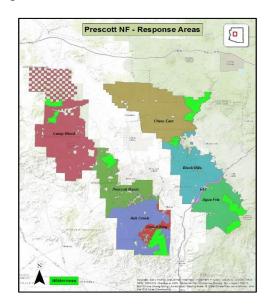
The Administrative Unit related to this plan is the Prescott National Forest. The Unit is divided into three districts including the Chino, Bradshaw and Verde Ranger Districts.

B. Land Management Plan Direction

Direction and guidance for Fire Management planning, response and decisions is provided by the Prescott National Forest Land Management Plan and Fire Management Plan.

C. Prescott NF Response Areas

The Prescott NF Response Areas are related to the Fire Management Units on the PNF. Each area is defined as Wildland Urban Interface (WUI), Non-WUI or Wilderness. There is an additional response area built to cover the Interstate 17 corridor.



• Refer to Appendix G: PNF Response Areas

⁴ Link to Forest Service Manual 5120.45 Direction for Fire Danger Pocket Cards

D. Fire History

From 1970 to 2013, there have been 3,892 statistical fires on the Prescott National Forest. For this time period, the Prescott NF experienced an average of 91 fires per year. The total acreage burned amounts to 161,822 - for an average of 3,892 acres per year. 2,334 fires were lightning caused (Figure 2), while 1,558 fires were human caused (Figure 3).

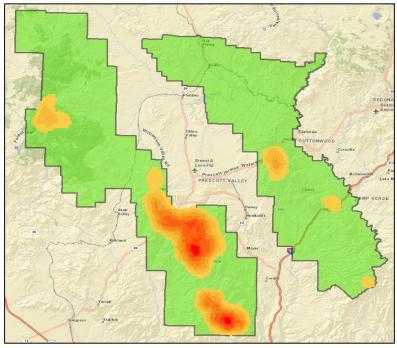


Figure 2 - Density of Lightning Caused Fires

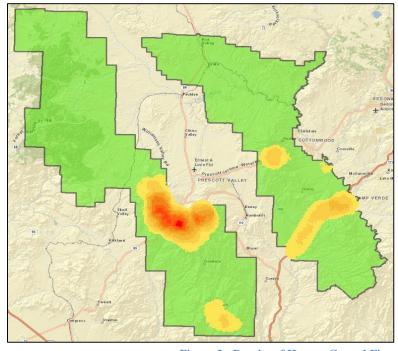


Figure 3 - Density of Human Caused Fires

• Refer to Appendix H: PNF Fire History

E. Fire Danger Rating Areas

1. Mountains

The mountain areas of the Prescott National Forest includes the Juniper, Santa Maria, Sierra Prieta, Bradshaw, Black Hills and Mingus Mountains.

a. Fuel Models

At the highest elevations, the vegetation ranges from pure ponderosa pine forests to mixed conifer forests of Douglas-fir and white-fir. The fuels of concern include ponderosa pine with brush/grass understory which creates the potential for transition from surface to crown fire. Other concerns for this area are large stands of chaparral and the existence of significant dead fuel loading.

b. Topography

The most outstanding topographic features include the mountain ranges listed above with the highest elevations around 8,000 feet. Numerous canyons and drainages exist that have a southwest to northeast orientation.

c. Climatology

The weather in the mountains is moderate with daytime temperatures in the 40° - 50° range in the winter and the 80° - 90° range in the summer. Across the area, annual precipitation averages around 20 inches. Snow in the higher elevations is common in the winter. The North American monsoon, which originates over Mexico and spreads into the southwest United States, does affect the area with significant precipitation generally from July through September. The area generally experiences a green-up period during spring and also following the monsoon. The predominant wind direction for this area is southwest.

2. Valleys & Basins

The valleys and basins of the Prescott National Forest includes the Agua Fria Grasslands, Battle Flat, Black Mesa and the foothills west of the Verde River.

a. Fuel Models

Fuels in the valleys and basins include desert grassland in the lower elevations and large areas of chaparral, pinon/juniper/oak woodlands in the middle elevations. Dense, mature brush is the primary fuel of concern within this area. Another concern in this area is the existence of significant dead fuel loading.

b. Topography

The predominant topographic features in this zone include rolling hills of the grasslands and mixed terrain with dense stands of brush.

c. Climatology

The weather in the valleys and basins is moderate, with daytime temperatures in the 55° - 65° range in the winter and the 95° - 105° range in the summer. Across the area, annual precipitation averages around 10 - 15 inches. The mid-range elevations do receive snow in the winter, with rain in the lower elevations. Like the mountains, this area is affected by the North American monsoon and receives significant precipitation from July through September. Green-up normally occurs twice per year, in the spring and following the monsoon. The predominant wind direction for this area is southwest.

F. Weather Station Network Needs

There are preliminary discussions underway regarding the need for an additional weather station in the area of the Agua Fria grasslands.

All Prescott NF RAWS have been upgraded over the last two years which will keep them in compliance with all NWCG standards for many years to come.

V. CLIMATIC BREAKPOINTS / FIRE BUSINESS THRESHOLDS

A. Overview

Climatic breakpoints and fire business thresholds are established to provide decision points for management actions within a fire danger rating area.

B. Climatic Breakpoints

Climatic breakpoints are points on the cumulative distribution of one fire danger index computed from climatology without regard for associated fire occurrence. For example, the value of the 90th percentile ERC is the climatic breakpoint at which only 10 percent of the historic ERC values have been greater.

In determining breakpoints, the range of data analysis is different for different decision types. For all decision types, the range of years for historic weather data will be from 1995 to present. For severity decisions, year-round data will be used (Figure 4). For staffing levels and restriction decisions only fire season data (April - September) will be used (Figure 5).

1. Predetermined Percentiles

The percentiles for climatic breakpoints are predetermined by agency directive. For the US Forest Service, the 90th and 97th percentiles will be used.

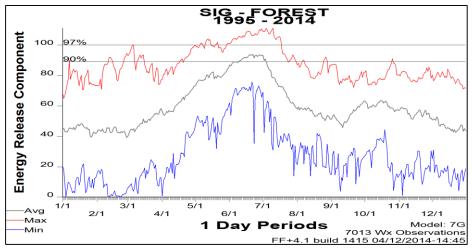


Figure 4 - Percentiles for Severity Decisions

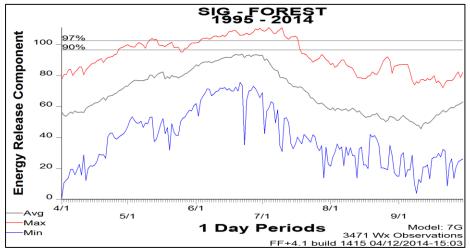


Figure 5 - Percentiles for Staffing Level & Restriction Decisions

C. Fire Business Thresholds

Fire business thresholds are values of one or more fire indices that have been statistically related to occurrence of fires. Generally, the threshold is a value or range of values where historically, fire activity has increased or decreased.

For the Prescott National Forest, the fire danger component that relates most closely to fire occurrence, large fire occurrence and multi-fire days is the Energy Release Component.

APPENDICES

A. PNF RAWS Maintenance Schedule

<u>Iron Springs Annual Maintenance Last Performed: 07/09/15</u>

RH/AT Last Replaced: July 2015
FM/FT Last Replaced: No longer used
Wind Speed/Direction Last Replaced: July 2015
Tipping Bucket Last Replaced: June 2014
Solar Radiation Last Replaced: June 2014
Battery Last Replaced: February 2007

Crown King Annual Maintenance Last Performed: 04/16/15

RH/AT Last Replaced: April 2015
FM/FT Last Replaced: April 2015
Speed/Direction Last Replaced: Ma

Wind Speed/Direction Last Replaced: May 2014
Tipping Bucket Last Replaced: April 2015
Solar Radiation Last Replaced: May 2014
Battery Last Replaced: April 2012

Verde Annual Maintenance Last Performed: 07/16/15

RH/AT Last Replaced: <u>July 2015</u> FM/FT Last Replaced: July 2015

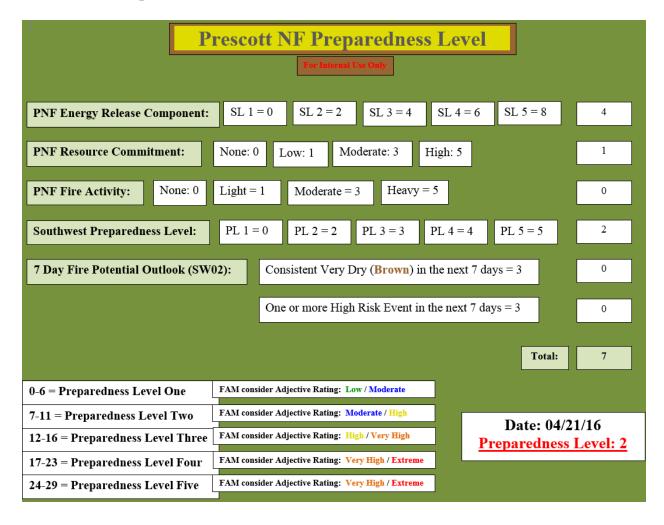
Wind Speed/Direction Last Replaced: July 2015
Tipping Bucket Last Replaced: July 2013
Solar Radiation Last Replaced: July 2013
Battery Last Replaced: July 2013

Cherry Annual Maintenance Last Performed: 07/16/15

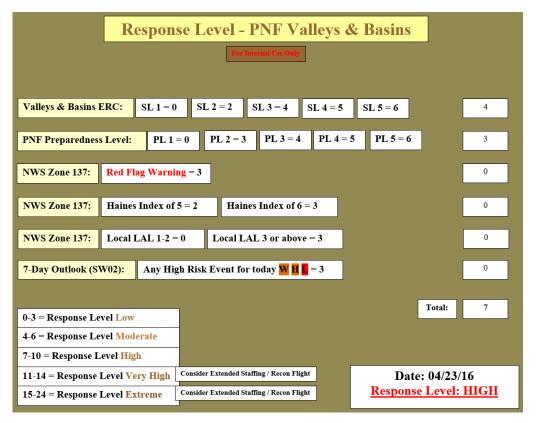
RH/AT Last Replaced: July 2015 FM/FT Last Replaced: July 2015

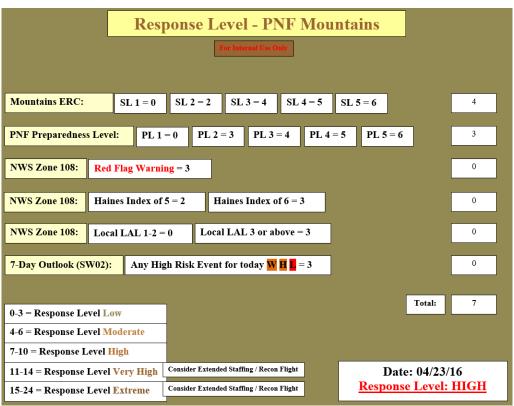
Wind Speed/Direction Last Replaced: July 2015
Tipping Bucket Last Replaced: July 2013
Solar Radiation Last Replaced: July 2013
Battery Last Replaced: July 2013

B. PNF Preparedness Level



C. PNF Response Level





D. PNF Restriction / Closure Decision Matrix

| Restrictions/Closure Decision Criteria | | | | | |
|--|--|--|--|--|--|
| For Internal Use Only | | | | | |
| PNF Preparedness Level: PL 1 = 0 PL 2 = 2 PL 3 = 4 PL 4 = 6 PL 5 = 8 | | | | | |
| Southwest Preparedness Level: PL 1 = 0 PL 2 = 1 PL 3 = 3 PL 4 = 5 PL 5 = 7 | | | | | |
| Proximity to historic onset of Monsoon: | | | | | |
| Monthly Outlook: Temp BN / Precip AN = 0 Temp or Precip AN = 3 Temp AN / Precip BN = 5 | | | | | |
| Total 0 | | | | | |
| 11 - 14: Consider Stage 1 Restrictions 15 -18: Consider Stage 2 Restrictions | | | | | |
| 19 - 23: Consider Partial/Full Closure | | | | | |
| Additional Considerations | | | | | |
| Significant Increase/Decrease in Recreation Use | | | | | |
| Neighboring Units Considering/Implementing Restrictions | | | | | |
| Local Political/Economic Impacts Date: 03/01/16 | | | | | |

E. PNF Industrial Fire Precautions Plan

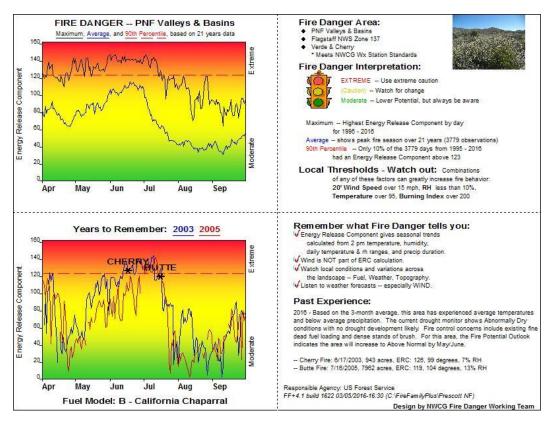
| EMERGENCY FIRE PRECAUTION SCHEDULE | | | | |
|--------------------------------------|---------------------------------|--|--|--|
| FIRE RESTRICTION/CLOSURE "STAGE" | | | | |
| "STAGED" RESTRICTION LEVELS | INDUSTRIAL FIRE PRECAUTION PLAN | | | |
| NO RESTRICTIONS | A | | | |
| STAGE I | В | | | |
| STAGE II | С | | | |
| PARTIAL/FOREST CLOSURE ** | D | | | |
| RED FLAG WARNING | D | | | |
| (Issued by National Weather Service) | | | | |

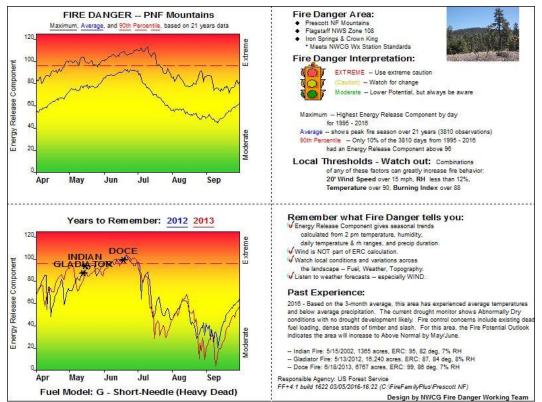
INDUSTRIAL FIRE PRECAUTION PLAN – DESCRIPTION

Authorized user will restrict operations in accordance with the attached Emergency Fire Precaution Schedule:

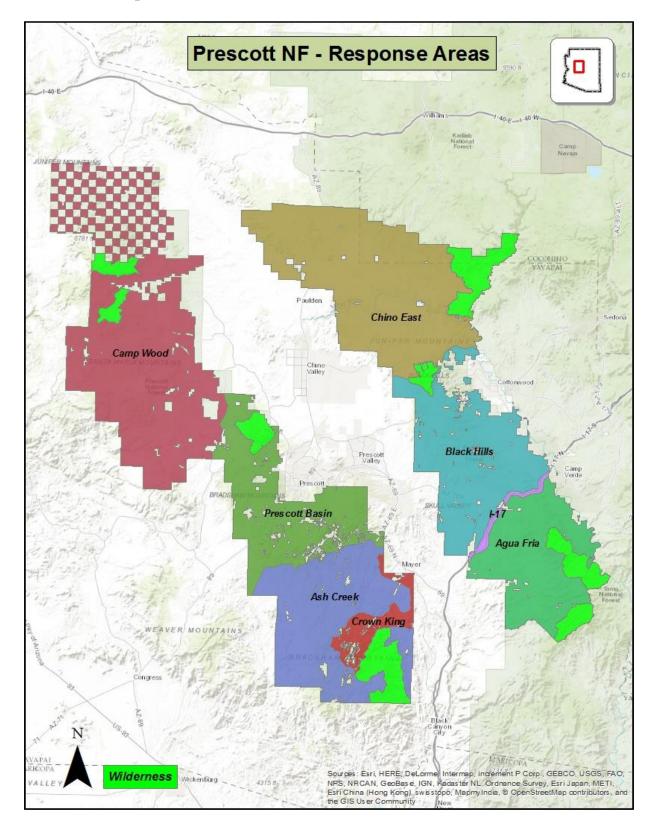
- A Normal Fire Precautions No fire guard required except for welding and blasting operations.
- **B** Normal Fire Precautions Authorized user will provide fire guard.
- C All power equipment use as well as blasting and welding operations will shut down from 9:00 am until 8:00 pm Mountain Standard Time (10:00 am to 9:00 pm MDT). Operations on mineral soil involving activities such as road excavation, watering, grading, surfacing, rock crushing, and/or other equipment maintenance may continue. Authorized user will provide fire guard.
- **D** Shutdown all operations; except operations on mineral soil involving road excavation, watering, grading, gravel surfacing, and rock crushing may continue with special Forest Service permit. Blasting and welding are prohibited. Authorized user will provide fire guard.

F. PNF Pocket Cards

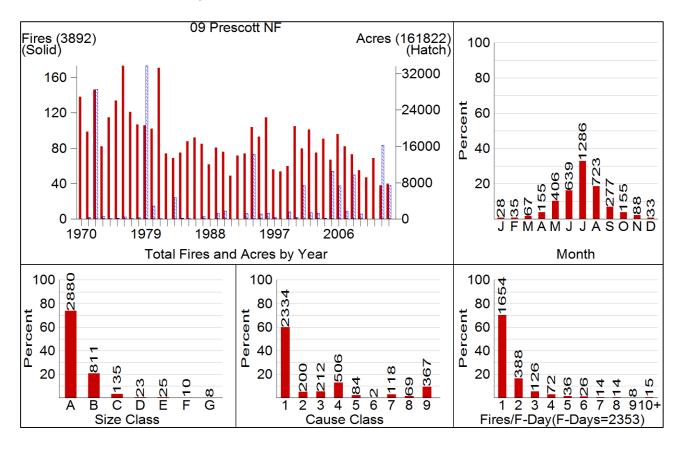




G. PNF Response Areas



H. PNF Fire History



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